	REVISIONS			
	LTR	**DESCRIPTION**	**DATE**	**APPROVED**
	A	Angle of illumination specified as a maximum. Maximum limit of dominate wavelength changed. Added LED diffusion test. Changed dominate wavelength test equipment requirements. Added CAGE 50434.	14 Oct 1988	Jack Niles
	B	Added CAGE 07479. Editorial changes throughout.	14 Mar 1992	G. A. Lude
	C	Added CAGE 10236. Editorial changes throughout.	29 Jan 1996	M. Stucker
	D	Reformat drawing and update supplier base	30 April 2003	Thomas M. Hess

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DEFENSE LOGISTICS AGENCY
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COLUMBUS, OHIO 43216-5000

Prepared in accordance with ASME-14.100 Selected item drawing

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REV STATUS OF PAGES	**REV**			D	D	D	D	D	D	D	D	D	D	D	D	D	D	D				
	PAGES			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				

PMIC N/A	**PREPARED BY** Jack Niles	**DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OH** **http://www.dscc.dla.mil/programs/milspec/docsearch.asp**
Original date of drawing 30 July 1987	**CHECKED BY** Jack Niles **APPROVED BY** John Buchanan	**TITLE** INDICATOR ASSEMBLIES: IR SECURE LIGHTING; RED, YELLOW, GREEN; PANEL SEALING
	SIZE A / **CODE IDENT. NO.** 14933	**DWG NO.** 87019
	REV D	**PAGE** 1 **OF** 15

AMSC N/A 5961-E007

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

1.1 Scope. This drawing describes the requirements for IR secure indicator assemblies with panel sealing and panel and rear sealing with filtered type lens designed for sunlight viewing, with antireflection coated lens and available with electrostatic screen.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown as follows:

87019	R	01
Drawing number	Color (see 1.2.1)	Device type (see 1.2.2)

1.2.1 Color designators. The color designators shall be a single digit character as follows:

Color designator	Color (peak wavelength)	
G	Green	(571 nm)
Y	Yellow	(585 nm)
R	Red	(626 nm)

1.2.2 Device types. The device types shall be as follows:

Device type	Description	Figure number
R01, Y01, G01	Long body; flat glass IR blocking lens with restricted viewing angle for securing lighting and sunlight viewing; anti-reflection coating; 30º full cone angle maximum of illumination; rear terminations sealed. 1/	1
R02, Y02, G02	Long body; flat glass IR blocking lens with restricted viewing angle for secure lighting and sunlight viewing; anti-reflection coating with electrostatic screen, 30º full cone angle maximum of illumination; rear termination sealed. 1/	1

1.3 Package materials, configurations and dimensions. The package configurations and dimensions are shown on figure 1. Dimensions are in millimeters; inch equivalents are in parentheses. The package materials shall consist of the following:

a. Shroud and contrast ring: Aluminum alloy, black anodized.

b. Body and nut: Aluminum alloy.

c. Washer: Copper alloy, tin plated or nickel plated.

d. Lens: Glass.

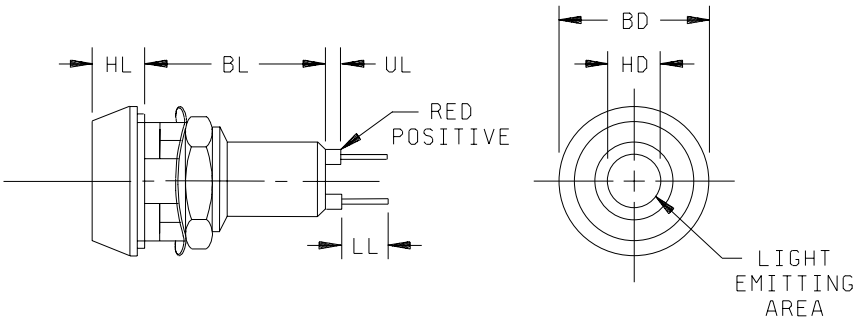
e. Sealing ring: Polytetrafluoroethylene (PTFE).

f. Terminations:

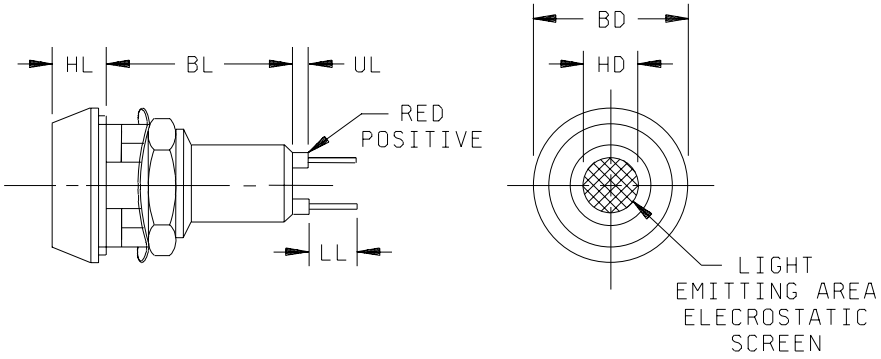
(1) Material: Copper alloy, Kovar or Alloy 42.

(2) Finish: Silver plate, tin-lead, or gold plate, see 6.2.i.

1/ The off-axis angle where the luminous intensity is one half the on-axis intensity shall be 15 degrees maximum and 10 degrees minimum.



Dash numbers R01, Y01, and G01



Dash numbers R02, Y02, and G02

Ltr	Millimeters		Inches	
	Min	Max	Min	Max
BD		13.10		.516
BL	19.00	20.02	.748	.788
HD	5.09	5.11	.197	.205
HL		5.51		.217
LL	8.00	11.00	.315	.433
UL	0.99	2.01	.039	.079

NOTES:
1. Dimensions are in millimeters.
2. Inch equivalents are given for general information only.
3. Mounting hardware dimensions: Nut = 10 mm (.394 inch) A/F, and washer = 13.1 mm (.516 inch) O/D maximum.

FIGURE 1. Dimensions and configurations.

1.4 Absolute maximum ratings.

	Red	Yellow	Green
Peak forward current	90 mA dc	60 mA dc	90 mA dc
Forward current	30 mA dc	20 mA dc	30 mA dc
Reverse voltage	5 V	5 V	5 V
Dominant wavelength	635 nm	590 nm	572 nm
Power dissipation	135 mW 2/	85 mW 3/	135 mW 2/
Power emission (350 through 930 nm)			
At I_F = 10 mA dc	1 µW	1 µW	1 µW
Luminous intensity at I_F = 10 mA dc	2.5 mcd	4.0 mcd	5.0 mcd
Operating and storage temperature	-55ºC to +100ºC		

1.5 Absolute minimum ratings.

Insulation resistance 4/ 1,000 MΩ

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-L-3661	-	Lampholder, Indicator Lights, Indicator Light Housings, and Indicator-Light Lenses, General Specification for.
MIL-C-5541	-	Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
MIL-A-8625	-	Anodic Coatings for Aluminum and Aluminum Alloys.
MIL-PRF-13830	-	Optical Components for Fire Control Instruments, General Specification Governing the Manufacture, Assembly, and Inspection of.
MIL-C-14806	-	Coating, Reflection Reducing, for Instrument Cover Glasses and Lighting Wedges.
MIL-PRF-19500	-	Semiconductor Devices, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-HDBK-454	-	Standard General Requirements for Electronic Equipment.
MIL-STD-750	-	Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2/ Derate at 1.8 mW/ºC above +25ºC ambient temperature.
3/ Derate at 1.6 mW/ºC above +50ºC ambient temperature.
4/ Between both terminations and indicator body.

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

IESNA RP-16 - Nomenclature and Definitions for Illuminating Engineering.

(Application for copies should be addressed to the American National Standards Institute, 1819 L Street, NW, Washington, DC 20036.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500 and herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500.

3.3 Design.

3.3.1 Configurations and construction. The design configurations shall conform to 1.3, figure 1, and the other attributes specified herein. Each indicator assembly shall consist of a metal body (housing), an integral light emitting diode with a diffusant, diffusing surface, or a uniform diffuser film placed in front of the LED, a glass lens that is sealed to the body with a metal lens cap, an infared suppressing filter, a sealing capability between the body and mounting panel, and with solid termination leads.

3.3.2 Parts, processes, materials, and finishes. The parts, materials, processes, and finishes shall conform to guideline 5 of MIL-HDBK-454, MIL-L-3661 and MIL-C-5541, class 3.

3.3.2.1 LED diffusing. Light emitted by the indicator assembly must be uniformly diffused. The light emitting area of the indicator assembly shall be measured with the photometer described in 4.4.2.1 utilizing a measuring spot size meeting the requirements of 3.3.3.3. Four regions of the light emitting area shall be measured perpendicular to the front plane of the indicator assembly. The four regions shall be with one centered on-axis and the other three regions centered off-axis at one half the radius of the light emitting area, with their centers 120 degrees in angular rotation apart. The luminous intensity of the three off-axis regions shall vary no more than 50 percent of the luminous intensity of the on-axis region.

3.3.2.2 Shroud and contrast ring. The shroud and contrast ring shall be black anodized (matt) aluminum alloy in accordance with MIL-A-8625. When shroud is not integral to the body, a locking compound shall be used to secure shroud to body.

3.3.2.3 Body and nut. The body and nut shall be aluminum alloy, conversion coating finish to MIL-C-5541, class C or body black anodization to MIL-A-8625 (see 6.2.j). The shroud and contrast ring may be integral with body.

3.3.2.3.1 Mounting information. Figure 3 shows the recommended mounting hole and details.

3.3.2.4 Lead terminations.

3.3.2.4.1 Material. The base material shall be copper alloy, Kovar or Alloy 42.

3.3.2.4.2 Finish. The termination finish shall be silver plate, tin-lead, or gold plate and shall be solderable in accordance with method 2026 of MIL-STD-750 (see 6.2.g).

3.3.2.5 Washer. The washer shall be copper alloy with tin or nickel plate.

3.3.2.6 Sealing ring. The sealing ring shall be polytetrafluoroethylene (PTFE).

3.3.2.7 LED leads. The LED leads shall be attached to terminations using a welding or high temperature solder process.

3.3.3 Filter lens. The filter lens shall be a neutral color transmission glass filter without converging or diverging power.

3.3.3.1 Filter luminous transmission. The filter shall have a luminous transmission 40 percent maximum in the spectral region 400 through 700 nanometers as measured with an eye corrected photometer or equivalent.

3.3.3.2 Filter power transmission. The filter shall have a power transmission of .5 percent maximum in the spectral region 700 through 930 nanometers for red, yellow, and green as measured with the spectrograph of 4.4.3 or equivalent. The actual .5 percent maximum transmission through 930 nanometers may begin between 600 nanometers and 700 nanometers.

3.3.3.3 Filter transmission uniformity. The spectral transmission of the filter between 350 and 930 nanometers shall remain uniform throughout the entire clear aperture of the filter as measured with the spectrograph of 4.4.3 or its average value throughout the filter. Permissible range of measuring spot size shall be greater than 0.127 mm (0.005 inch) and less than 16.51 mm (0.065 inch) in diameter. If the assembly includes an electrostatic mesh screen as in figure 1, either the measuring spot shall be smaller than the screen openings (and the measurements shall be made only within the open areas), or it shall be large enough to include several such openings so that the opaque regions of regularly spaced mesh have no net effect on uniformity measurements.

3.3.3.4 Antireflection coating. The coating on the operator side of the filter shall be an antireflection coating in accordance with MIL-C-14806 with the exception that the spectral reflectance shall be as follows:

Wavelength range (nanometers)	Reflectance (percent maximum) for angle of incidence shown	
	0 degrees	30 degrees
440 to 685	0.6 absolute	1.0 absolute
	0.4 average	0.5 average

3.3.3.5 Filter-surface quality. The filter shall meet or exceed the scratch-dig quality requirements of MIL-PRF-13830, level 60-40.

3.3.4 Electrostatic protection. A transparent conductive film coating or conductive mesh shall be provided between the lens and LED. This coating of mesh shall act as an EMI shield, providing a maximum resistance of 7 ohms per square.

3.3.5 LED source. The LED shall be an integral part of the indicator assembly and is not replaceable.

3.4 Marking. The following marking shall be placed on each indicator device and shall be legible at time of shipment:

a. Part number (see 1.2).

b. Lot identification code (see MIL-PRF-19500).

c. Manufacturer's name, trademark, or identification (see MIL-PRF-19500).

3.5 Manufacturer eligibility. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply (see 6.4 and 6.5).

3.6 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.7 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.

3.8 Workmanship. The indicator assemblies shall be uniform in quality and free from any defects that will affect life, serviceability or appearance.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-PRF-19500.

4.2 Screening. All devices shall be screened in accordance with table I herein. Devices that exceed the limits of table II herein shall be rejected.

4.2.1 Burn-in conditions. Power burn-in conditions shall consist of I_F = 20 mA dc for yellow and 30 mA dc for red and

green (constant current shall be maintained), at T_A = +25ºC ± 5ºC for 168 hours minimum.

4.3 Quality conformance inspection.

4.3.1 Group A inspection. Group A inspection shall consist of the inspections and tests specified in table III herein.

4.3.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in MIL-PRF-19500 and table IV herein. Electrical measurements shall be in accordance with table II herein.

4.4 Methods of inspection. Methods of inspection shall be as specified herein.

4.4.1 Visual and mechanical inspection. Indicator assemblies shall be examined under a magnification between 3X and 10X. Indicators that exhibit any of the following defects shall be rejected.

a. Termination identification, markings (content, placement, and legibility), materials, construction, and workmanship not in accordance with the requirements specified herein.

b. Defects or damage resulting from manufacturing, handling, or testing.

c. Visible evidence of corrosion, contamination, or breakage, grossly bent or broken terminations, cracked seals, and peeled, flaked, or blistered plating. (Discoloration of the finish shall not be cause for failure unless there is evidence of flaking, pitting or corrosion.)

d. Terminations that are not intact and aligned in their normal location, free of sharp or unspecified termination bends.

e. Terminations and lens that are not free of foreign material such as paint, or other adherent deposits, or dust.

4.4.2 Axial luminous intensity. This measurement is made with a photometer described, calibrated, and operated as specified herein.

4.4.2.1 Description of photometer.

4.4.2.1.1 Type of response. The photometer shall be of a type that is designed to respond to illuminance (or luminous incidence); that is, incident luminous flux density or lumens per unit area. Units for luminous incidence are lux (lm/m^2). The output of the photometer shall be linearly related to luminous incidence over the range of levels encountered in calibration and measurement. The output may be a voltage or a current, or may be rendered directly in the units of luminous incidence.

4.4.2.1.2 Spectral response. The relative response of the photometer shall be within 6 percent of (λ) at all wavelengths within the effective spectrum of devices to be measured, where (λ) is the photopic spectral luminous efficiency value as given in IESNA RP-16. The effective spectrum for a given type of device extends from the minimum to the maximum wavelength (λ) values. The photometer must have as a calibrated accessory (for that particular photometer) a tristimulus and color temperature fitter set. This accessory must be used for determining chromaticity coordinates and dominant wavelengths (λd) of LEDs when reference to illuminant "C".

4.4.2.1.3 Receptance pattern. The off-axis receptance of the photometer shall be constant over a large enough angle that it responds equally to light from all parts of the device to be measured. An effective plane of receptance (image of the detecting surface) shall be defined with respect to which the calibration can be performed.

4.4.2.2 Calibration of photometer. Radiation from a certified (NBS traceable) standard of spectral radiant incidence produces at its specified reference plane a known level of spectral radiant incidence, $E_e(\lambda)$ ($\mu W/cm^2$ per nanometer of wavelength). By passing this radiation through an interference filter of known spectral transmittance, λ in a narrow band (<20 nm) centered at λ_o (a dimensionless function of wavelength), a narrow band of spectral radiant incidence $E_e(\lambda)\ _e(\lambda)$ is obtained. This is converted to luminous incidence by integration:

$$E(\lambda_o) = 6.80 \int_{o}^{\infty} E_e(\lambda)\ _e(\lambda)\ (\lambda) d\lambda$$

Where: $E(\lambda_o)$ = luminous incidence (lux) at the reference plane of the standard of spectral radiant incidence, for a wavelength,

$$\lambda_o \_ \lambda \text{ (ave)} = \frac{\lambda \text{ (min)} + \lambda \text{ (max)}}{2}$$

$E_e(\lambda)\ _e(\lambda)$ = spectral radiant incidence ($\mu W/cm^2$) resulting from passing the flux from the standard of spectral radiant incidence $E_e(\lambda)$ through a filter of spectral transmittance $_e(\lambda)$.

$V(\lambda)$ = photopic spectral luminous efficiency value as given in IESNA RP-16

6.80 = units conversion constant (lux per $\mu W/cm^2$) obtained from the product of 680 lumens per watt, the peak of the standard observer response, and 10,000 cm/m^2.

With the photometer receptance plane at the reference plane of the standard of spectral radiant incidence, the luminous incidence thus calculated (in lux) is applied. The response of the photometer, to this standard luminous incidence, is $P_{std}(\lambda_o)$.

4.4.2.3 Operation of photometer. The indicator assembly to be measured is aligned at the angle specified, and at a known distance, d (meters) from the receptance plane of the photometer. Specified drive current is applied to the indicator and the luminous intensity is computed from the photometer indications, P_{LED}:

$$^{I}LED = \frac{^{P}LED}{P_{std}(\lambda_o)} \cdot E\ (\lambda_o) \cdot d_2$$

Where: ^{I}LED = luminous intensity of the LED (candelas).

$\frac{^{P}LED}{P_{std}(\lambda_o)}$ = ratio of photometer response from LED to response from standard luminous incidence.

$E(\lambda_o)$ = standard luminous incidence (lux) calculated as above.

d = distance (meters) from emittance plane of LED to receptance plane of photometer.

Use of the wavelength designator, λ_o, implies only that the photometer response was calibrated at that wavelength. The interference filter should not be used with the photometer in measuring; it is used only for calibration.

4.4.3 Power measurements. Power measurements shall utilize a spectrograph having the following detector or equivalent: A generation II microchannel plate (MCP) proximity focused type, intensified self-scanning, high quantum efficiency, multi-element, silicon photodiode array with an S-20 extended red response. This detector must have the following characteristics:

Minimum dynamic range of detector A to D converter: 16,383 counts/photo electron.

Detector saturation level: 40 ±10 picowatt seconds per square centimeter.

Detector dark current noise: 2 ±2 counts rms out of 16,000 ±400 for a 10-millisecond exposure time.

4.4.3.1 Stray light test for self scanning spectrograph assembly. The system shall sample the spectra between 350 nanometers and 930 nanometers utilizing appropriate averaging times to increase system dynamic range. When measuring an incandescent light source that is filtered with a WAMCO, Incorporated NV-2YL-1 yellow filter (no substitute filter may be used), and set to a level of 100 foot lamberts, the energy measured at 800 nanometers shall be no more than .01 percent of the energy measured at 470 nanometers. Each NV-2YL-1 filter procured by the vendor must be accompanied by the transmission data for each particular filter at 5 nanometers intervals from 400 nanometers to 930 nanometers (see figure 2).

4.4.3.2 Calibration method. Equipment must have all measurement functions calibrated and traceable to the National Bureau of Standards (NBS) within a 3-month period prior to their use for any measurements. This equipment shall be calibrated annually thereafter for all measurement functions utilized and be traceable to NBS. Calibrate the system for wavelength with a low pressure potassium (K) spectral line lamp and for power with standard of spectral radiance.

4.4.4 Total power measurement. This measurement shall utilize the spectrograph in 4.4.3 and an integrating sphere and the conditions of table II to determine the total power emission.

4.4.5 Power emission. This measurement shall utilize the spectrograph in 4.4.3 and the conditions defined in table II. The limits for each color shall meet the specified percentage of the total power measured in this test.

4.4.6 Dominant wavelength. This measurement shall utilize the photometer in 4.4.2.1 with the calibrated tristimulus filter set, and the conditions defined in table II, to determine the dominant wavelength.

TABLE I. Screening tests.

Test	MIL-STD-750 Method	Conditions and measurements
High temperature storage (nonoperating)	1032	T_A = +100ºC, time = 72 hours minimum
Thermal shock (temperature cycling)	1051	Test condition A, except $T_{(high)}$ = +100ºC 10 cycles; time at temperature extremes = 15 minutes minimum
Constant acceleration	2006	Nonoperating 20,000 g; Y_1 only
Seal	1011	Test condition A
Pre burn-in measurements		I_V, in accordance with table II
	4011	V_F
	4016	I_R
Burn-in (forward bias)		I_F = 20 mA dc, Y; 30 mA dc, R and G; T_A = +25ºC ± 5ºC, 168 hours minimum
Post burn-in measurements		I_V, in accordance with table II (within 72 hours of burn-in)
	4011	V_F
	4016	I_R
		P_E, in accordance with table II
		ΔI_V = 20 percent maximum from initial value
		ΔV_F = ± 50 mV from initial value

TABLE II. Electrical and spectral measurements.

Test	Dash number	MIL-STD-750		Symbol	Limits		Unit
		Method	Condition		Min	Max	
LED diffusion (see 3.3.2.1) 1/	X01, X02		I_F = 10 mA	I_D	50	150	Percent of on-axis luminous intensity
Luminous intensity (see 4.4.2 measured on-axis)	R01, R02		I_F = 10 mA	I_V	0.5	2.5	mcd
	Y01, Y02		I_F = 10 mA	I_V	0.5	4.0	mcd
	G01, G02		I_F = 10 mA	I_V	0.5	5.0	mcd
Total power emission (350 through 930 nm) (see 4.4.4) 1/	X01, X02		I_F = 10 mA	P_E		1	µW
Power emission (see 4.4.5)	R01, R02		I_F = 10 mA 700 through 930 nm	P_{IRR}		0.5	percent of total
	Y01, Y02		I_F = 10 mA 675 through 930 nm	P_{IRY}		0.5	percent of total
	G01, G02		I_F = 10 mA 620 through 930 nm	P_{IRG}		0.5	percent of total
Dominant wavelength (see 4.4.6) 2/	R01, R02		I_F = 10 mA	Λd	615	635	nm
	Y01, Y02		I_F = 10 mA	Λd	580	590	nm
	G01, G02		I_F = 10 mA	Λd	555	572	nm
Forward voltage 1/	X01, X02	4011	I_F = 10 mA	V_F	1.6	3.0	V
Reverse current 1/	X01, X02	4016	V_R = 5 V	I_R		100	µA
Insulation resistance 1/	X01, X02	1016	Condition 3 between both terminations (leads) and body	R_{ISO}	1,000		MΩ

1/ X = R, Y, and G.
2/ Referred to CIE illuminant “C” (.3101, .3163).

TABLE III. Group A inspection.

Inspection	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical inspection	2071					
Subgroup 2						
Luminous intensity 1/		I_F = 10 mA dc	I_V			
(Device types in accordance with table II)						
Forward voltage	4011	I_F = 20 mA dc	V_F	1.6	3.0	V dc
Reverse current	4016	V_R = 5 V dc	I_R		100	µA dc
Subgroup 3						
High temperature		T_A = +100ºC				
Luminous intensity 1/		I_F = 10 mA dc				
(Device types in accordance with table II)						
Reverse current	4016	V_R = 5 V dc	I_R		100	µA
Low temperature		T_A = -55ºC				
Luminous intensity 1/		I_F = 10 mA dc				
Forward voltage	4011	I_F = 20 mA dc	V_F	1.6	3.0	V dc
Subgroup 4						
Insulation resistance	1016		R_{ISO}	1,000		MΩ
Subgroups 5 and 6 Not applicable						
Subgroup 7						
Power emission (see 4.4)		In accordance with table II	P_{IRR} P_{IRY} P_{IRG}		0.5 0.5 0.5	percent percent percent

1/ Observe light output, visual examination only.

TABLE IV. Group B inspection.

Inspection	MIL-STD-750	
	Method	Conditions
Subgroup 1		
Solderability	2026	
Resistance to solvents	1022	
Subgroup 2		
Thermal shock	1051	Test condition A, $T_{(high)}$ = +100ºC
Immersion (seal)	1011	Test condition A
Watertightness (panel sealing)		See MIL-L-3661, sealing test watertight except maximum pressure 30 psi
Electrical and spectral measurements		See table II
Subgroup 3		
Life test	1027	
Electrical and spectral measurements		See table II
Subgroups 4 and 5		
Not applicable		
Subgroup 6		
High temperature life (nonoperating)	1032	
Electrical and spectral measurements		See table II
Subgroup 7		
Terminal strength	2036	Test condition A, 2 pounds for 20 seconds
Vibration	2056	
Shock	2016	
Electrical and spectral measurements		See table II

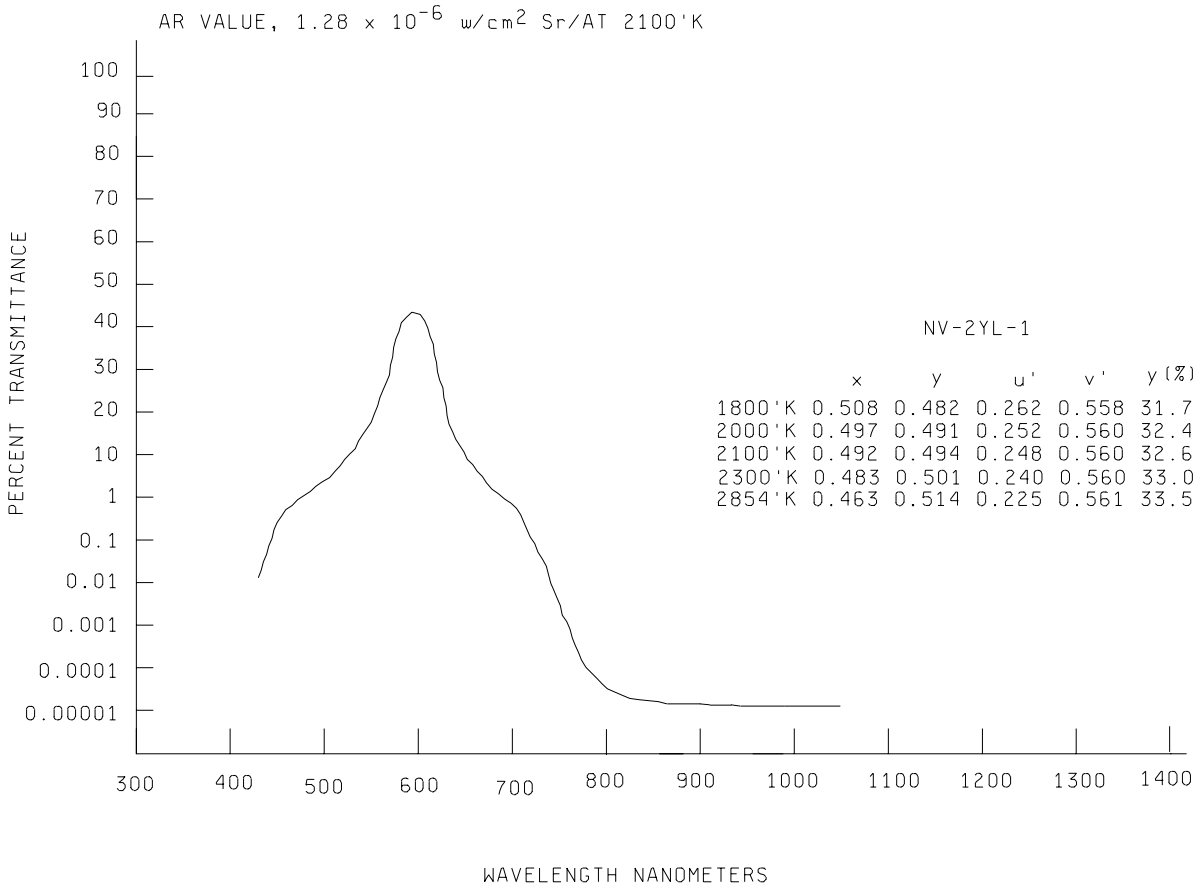


FIGURE 2. Filter transmission data, sample.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-19500.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Indicators conforming to this drawing are intended for use when performance specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplication of specifications, drawings, and stock catalog listings. When a performance specification exists and the product covered by this drawing has been qualified for listing on the QPL, this drawing becomes obsolete and will not be used for new design. The QPL product shall be the preferred item for all applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).

c. Complete PIN (see 1.2).

d. Requirements for delivery of one copy of the verification data with each shipment of parts by the manufacturer, if applicable.

e. Whether the manufacturer performs the group A and group B tests or provides certification of compliance with group A and group B requirements.

f. Requirements for certificate of compliance, if applicable.

g. Requirements for notification of change of product to acquiring activity, if applicable.

h. Requirements for packaging.

i. Lead finish (see 1.3.f(2)).

j. Body finish in accordance with 3.3.2.2 and 3.3.2.3.

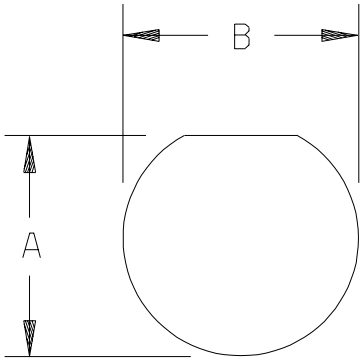
6.3 Replaceability. Indicator assemblies covered by this drawing will replace the same commercial device covered by contractor-prepared specification or drawing.

DSCC drawing PIN 87019-(1)	Color	Similar PIN
R01	Red	STR/LH/8/XIRR
Y01	Yellow	STR/LH/8/XIRY
G01	Green	STR/LH/8/XIRG
R02	Red	STR/LH/8/XIR/SESR
Y02	Yellow	STR/LH/8/XIR/SESY
G02	Green	STR/LH/8/XIR/SESG

(1) Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

6.4 Submission of certificate of compliance. The certificate of compliance submitted to DSCC-VAC, prior to listing as an approved source of supply in 6.5, shall state that the manufacturer's product meets the requirements herein.

6.5 Mounting information. Figure 3 shows the recommended mounting hole and details.



Ltr	Millimeters		Inches	
	Min	Max	Min	Max
A	7.5	7.6	.295	.299
B	8.0	8.1	.315	.319

NOTES:
1. Dimensions are in millimeters.
2. Inch equivalents are given for general information only.
3. Recommended mounting torque is 1 Nm.
4. Recommended chassis thickness is 3 millimeters maximum.
5. Sealing surface to be clean and burr free.

FIGURE 3. Mounting hole details.

6.6 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DSCC-VAC. For assistance in the use of this drawing, contact DSCC-VAC, P.O.Box 3990, Columbus Ohio 43216-5000, or telephone 614-692-0510.

DSCC drawing PIN 87019-	Color	Vendor PIN (1) CAGE number 3R006	Vendor PIN (1) CAGE number 10236
R01	Red	0X2410R	ML1619-R021
Y01	Yellow	0X2410Y	ML1619-Y021
G01	Green	0X2410G	ML1619-G021
R02	Red	0X2411R	ML1619-R121
Y02	Yellow	0X2411Y	ML1619-Y121
G02	Green	0X2411G	ML1619-G121

(1) Caution: This PIN is for information only, do not use this number for acquisition or marking.

Vendor CAGE number	Vendor name and address
10236	L3/Electrodynamics Incorporated 1200 Hicks Road Rolling Meadows, IL 60008-1017
3R006	Oxley, Incorporated 25 Business Park Drive Branford, CT 06405